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CHEMISTRY SUPPLEMENT

THF CHEMICAL DEPARTMENT OF OBERLIN COLLEGE

FROM

1833 TO 1912

BY

F. F. JEWETT AND FRANCES GULICK JEWETT

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THE OLD CHEMICAL LABORATORY

THE SEVERANCE CHEMICAL LABORATORY

The Chemical Department of Oberlin College from 1833 to 1912*

F. F. Jewett and Frances Gulick Jewett

The history of the joint beginnings of Oberlin College and its department of chemistry moves along somewhat as follows.

Mr. Shipherd and Mr. Stewart had met in Elyria, had prayed together and had decided to start a new educational institution "for the diffusion of useful science, sound morality and pure religion among the growing multitudes of the Mississippi Valley." Notice the order of their words, "science," then "morality and religion." This institution was to be a union of college and colony growing up together under the name Oberlin. It was to be located in the dense woods within ten miles of Elyria.

But, first of all, five hundred acres of these woods must be secured, money must be raised for buildings, and the religious papers of the country must help do the advertising.

So much having been decided, Mr. Shipherd started for Connecticut on horseback with three dollars in his pocket. This was in November, 1832.

Two weeks later he reached New Haven and called on Messrs. Street and Hughes, owners of the land. When he explained his mission and asked them to give him five hundred acres of their western woods, they smiled upon him and dismissed him as a visionary. Still he kept on calling day after day until at last they said:— "Well, Mr. Shipherd, we have concluded to accept your offer." They gave him the five hundred acres of land, and sold him an additional tract of nine square miles at a dollar an acre. This was to be parceled out into farms and re-sold at an advance of a dollar and a half per acre.

While Mr. Shipherd was still in the east, before buildings were put up on the land, or students were assembled to be taught, the head of the department of chemistry was elected. He was Dr. Dascomb, twenty-six years old, born in New Hampshire, and a graduate of the medical department of Dartmouth College. Mr. Shipherd had discovered him and wrote as follows to the previously chosen trustees of The Oberlin Collegiate Institute, (so called until 1850 when the name Oberlin College was adopted). Mr. Shipherd said:—

"I recommend that you elect Dr. Dascomb lecturer and professor of chemistry, botany, physical education or anatomy, and natural philosophy. He is highly recommended as a Christian, a physician and lecturer. I think that the physician of the colony should be a lecturer in the seminary, because we can't afford a full salary to such a lecturer, or full employment to a physician. I propose that we offer him two hundred and fifty dollars salary."

Dr. Dascomb accepted the offer, and was the first teacher elected. So the department was launched!

By September, 1833, Mr. Shipherd was back again in Elyria. He had been gone ten months, had secured his land, had raised something like $15,000, and had so interested the Christian public that colonists from New England were already trecking their way westward. He himself was now ready to help cut down trees and build up Oberlin.

We read that "the ring of the ax was now incessant," that "giant trees were falling with a crash on every side," that "primitive dwellings began to multiply," and that "by the end of June, 1834, more than twenty acres had been chopped over, a portion of it logged and burned, and a beginning made in sowing grass."

Dr. and Mrs. Dascomb had arrived on the tenth of May, 1834. "Road very bad from ruts and mud" writes Mrs. Dascomb. "We were in constant danger of over-turning. Once when we came to a ditch in the road the gentlemen got out and took down the fence, so that we could turn aside into the adjoining field and ride around the obstacle. Glad were we when an opening in the forest dawned upon us, and Oberlin was seen. "That," said the driver, "is the city." "We rode through its principal street, now and then coming in contact with a stump."

In those days, stumps and students were really the most conspicuous objects in Oberlin; stumps so numerous that President Fairchild says, "An agile boy might propose to cross the square by springing from stump to stump." And prospective students so numerous that Mr. Shipherd says, "Applications are without number from Lake Erie to the Gulf of Mexico, and from Michigan to the Atlantic."

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* Prepared by special request of the Physical Science Club.

But what about sleeping accommodations? What about a recitation building for Dr. Dascomb? Students themselves attended to such matters because they were carpenters and architects as well as farmers, citizens, and undergraduates. They helped put up the first public building in town. And they had time to do it because they were obliged to spend four hours each day on hard manual labor. Well spent time it was, judging by the catalogue of 1835. I quote:—

"Students by four hours of daily labor may preserve their health, clear and invigorate their minds, guard their hearts against morbid influences, earn their board, and facilitate instead of retarding their progress in scientific attainment." Notice that reference to science again!

Then follows the useful moral,—"The most delinquent in manual, have been the most deficient in mental labor." And this further statement,—"Drones cannot be indured in this hive of industry." The same catalogue also says: "Five cents per hour is allowed to able hands on the farm. Young ladies are allowed three cents per hour for domestic labor."

It was these young people who helped erect Oberlin Hall, the most universally occupied place in town. It measured thirty-five feet by forty, was two stories high with an attic; and for almost two years it served as recitation hall, dormitories, college offices, college chapel, community church, boarding house and kitchen.

Here it was that Dr. Dascomb began to teach in May, 1834. The chemical department was thus on its feet potentially, although the actual teaching of chemistry did not begin until 1835,—a year later.

In the meantime, we wonder if Dr. Dascomb, the conservative young man from New England, ever felt any thrill of enthusiasm for the whirl of new ideas into which he found himself plunged; that is whether he believed in co-education, manual labor as a college requirement, Grahamism, vegetarianism, perfectionism, etc.,—a whirl which marked the almost frenzied zeal of certain groups of early colonists.

President Fairchild refers to this matter. He says: "In temperament Dr. Dascomb was naturally cautious and conservative. Novelties had no attraction for him, and no enthusiasm ever swept him off his feet. The truth was what he wanted, and nothing else had any value in his eyes."

Speaking for himself, Dr. Dascomb writes, "The plans of the Institute are maturing so rapidly that the department which is assigned to me will demand the entire energies of one man. Under these circumstances I must either resign my office in the Institute or relinguish the practice of medicine. I prefer to do the former for several reasons.

"1. I am better qualified for the practice of my profession than for the duties of professor in the Institute.

"2. People have placed some confidence in me as a physician, but I think it very doubtful whether I should ever gain much reputation or be able to do much good as a lecturer.

"3. I am not entirely pleased with all the new measures respecting the Institute."

Still he did not resign. And, in 1835, we find him lodged in his first laboratory,—a remodeled carpenter's shop. Work-benches had been taken out, rough partitions put in, dormitories secured, also two lecture rooms, one for Dr. Dascomb and his sciences, the other for Dr. Finney and his thirty theological students just arrived from Lane Theological Seminary. Thus science and religion were already working harmoniously together.

The first Oberlin catalogue was printed in 1834,—a ten-paged leaflet with the opening words: "Hitherto the Lord hath helped us." The record for 1837 is "No catalogue published this year." Otherwise there is no failure in the series from 1834 to the present day.

The library copies up to 1880 are bound in large volumes. And a bit of yellow paper on the front page carries the simple statement, "Presented by Professor James Dascomb. Unbound." This is merely a side-light of character. But it shows methodical persistance on his part, a faithfulness in preserving landmarks, an appreciation of small things. And the fact that he himself handled each one of these yellow-paged pamphlets and laid them carefully away, adds to our personal interest in the catalogues themselves.

In each of them, between 1836 and 1847 are the following words: "None can be received who travel on the Sabbath on their way to Oberlin."

In 1836 there was a freshman class of thirty, a collegiate attendance of 113, and a total attendance of 391. The same year records another "first thing" for the chemical department,—a new building known for forty years afterwards as "The Old Laboratory." It was made of brick, was one story high, fifty feet long and thirty feet wide. In it was a lecture room with arched ceiling, raised seats, and a lecture table so arranged that light streamed down upon it through a skylight in the roof.

Here Dr. Dascomb gave his lectures and performed his experiments. His students listened to him, watched him and recited to him. They handled no apparatus whatever. For, in those days, not a college in the county provided laboratory work for the students themselves.

Nevertheless, here in Oberlin, for the first time in American history, men and women were seated in college classes studying chemtry together. This was part of the co-education movement, and it worked well.

The Old Laboratory stood a little south-west of where Sturges Hall now stands. It was the only building devoted to a single science until our Severance Chemical Laboratory was built.

DR. JAMES DASCOMB

"When the old Laboratory was erected," writes President Fairchild in 1883, "it occupied a very retired position in the rear of Colonial Hall; but upon the removal of the old building, and the laying out of College Place, it became quite conspicuous." With a touch of sadness he adds, "As these lines are being printed, the Old Laboratory stands dismantled and ready to fall. Those who shall gather at the Jubilee, looking for old landmarks, will scarcely recognize the place it occupied."

For forty-four consecutive years,—1834 to 1878,—Dr. Dascomb had kept on with his teaching. He never had a Sabbatical year, and no illness is referred to. On the contrary, we read that, "Through all the changes Dr. Dascomb held the same position, without change in his prescribed duties,—a conscientious, thorough, successful instructor."

With the exception of the years 1851 and 1852, nothing is ever said about text-books. Chemistry was studied in the second terms of the Junior and Senior years. And in each catalogue, the simple statement is: "Chemistry. Lectures." That is to say, Dr. Dascomb taught by the lecture method. But, for the years 1851 and 1852, we have the words, "Chemistry. Graham." Evidently a text book was being experimented with. After those two years it is not mentioned again — which was quite as well, for Graham's Chemistry was a rather difficult text for young students.

Aside from the above statements, we have no way of measuring the quality of the work done during the forty-four years of Dr. Dascomb's service. We know that general inorganic chemistry was the only branch taught, that he himself had studied it as a medical student, and that he doubtless gave his pupils such instruction as was given to other students elsewhere.

We know that Oberlin tried to maintain the standards of other colleges, Yale for example. For, in the Oberlin catalogue of 1840 a comparison is made. It shows that Oberlin and Yale had the same curriculum save that Yale had lectures in geology and mineralogy which Oberlin did not have, while Oberlin had botany which was not taught at Yale.

In 1878 Dr. Dascomb resigned his position and ranked in the catalogue as "Professor Emeritus."

The same 1878 catalogue refers to Professor

William Knowlton Kedzie as head of the department of chemistry. He was twenty-six years old, the son of President Robert Clark Kedzie, an Oberlin graduate of the class of 1847, and for many years President of the Agricultural College of Lansing, Mich. It was from his father's college that William Kedzie was graduated in 1875. He next spent a year in the Sheffield Scientific School of Yale, for five years taught chemistry in the Manhattan Agricultural College of Kansas, and came from there to Oberlin with his wife and infant son in the fall of 1878.

Kedzie and I were laboratory mates while he was in the Sheffield Scientific School. And we kept up our friendship through letter-writing until he died. He was so careful, industrious and persistant as a student that it is easy to understand his rare success as a teacher afterwards.

Dr. Dan Bradley knew him then, and I have asked him to write down his memories for me. He says:

"I was an undergradute at Oberlin when Professor Kedzie succeeded Dr. Dascomb who had been carrying on the chemistry work without any of the modern appliances and ideas. He instantly put a new spirit and value into the science, so that it came to mean an entirely different thing culturally. I did not enjoy the privilege of any of his chemistry classes. I learned what I did learn of that wonderful science from you in the days when you started Charlie Hall on his brilliant career. But I heard the men talk about Kedzie's revolutionary methods. I had Kedzie in rhetoricals,—freshman rhetoricals,— and he made them amount to something. We actually learned to speak and write English; to know what it all meant to have the use of a keen tool of speech. Whatever of English I ever learned, I got from Kedzie and Judson Smith. . . . Kedzie was a finished gentleman who treated us us freshies as he would the president of a bank, with respect and courtesy and confidence in our integrity and desire to improve our opportunities. And the boys responded to that chivalrous treatment."

Dr. Bradley was not the only one to feel the new impulse. Even the pages of the catalogues show it. Instead of the meager statement, "Chemistry. Lectures." the fuller statement of 1878 reads: "Junior Class. Second term. Lectures:— Chemical philosophy. Stoichiometry, History. Preparation, properties and uses in the arts, of elements and compounds. Daily class practice in the Laboratory. Eliot and Storer's Manual."

"Third Term. Qualitative analysis. Examination of solutions, Salts, Minerals, Ores, Compounds, etc. Fresenius Manual."

The catalogue had announced daily practice in the Laboratory, and Professor Kedzie busied himself to get ready for it. The place chosen was the first floor of Cabinet Hall,—a building bought from the town in 1874 for $5,000.00. It stood south east of the place now occupied by Peters Hall, and had served the village as a school house from 1852 to 1874.

While the laboratory was being put in shape for his students, Professor Kedzie suggested that they begin to experiment for themselves wherever they could find room for their chemicals and their apparatus. Enthusiastic youth rose to the occasion. They bought chemicals, improvised bits of apparatus, turned their bed-rooms and their boarding houses into private laboratories, and did their experimenting under difficulties rather more serious than they themselves quite appreciated. In fact this method had enormous disadvantages. It filled their rooms with noxious fumes. These fumes spread through entire buildings. Matrons protested. Fellow students scolded. Towns-people were amused. All were relieved, therefore, when Cabinet Hall was ready for the chemists, and when private homes and dormitories could get rid of them.

There is no doubt about the enthusiasm which Kedzie inspired, nor about the outlook for the future which faced him. He had entered a large field. And his work for over a year was supremely successful. But just then, in the midst of his brilliant beginnings, illness overtook him. And before the middle of his second year he had to give up all work,—not to take it up again. His brother Robert Kedzie taught in his place until the end of the college year.

In the meantime,—on the third of April, 1880, Dr. Dascomb died after forty-six years in Oberlin, an aged man of seventy-two. Also, on the fourteenth day of the same month, of the same year, the young man William Kedzie died at the age of twenty-eight. He was beloved by teachers and by pupils alike. His years had been few. But he had lived long enough to be an inspriation to the next generation.

Through Professor Kedzie's recommendation I was offered the chair of chemistry and mineralogy as his successor. This was accepted. And my wife and I reached Oberlin from

Japan for the opening of the fall term of 1880. Surprises were in store for me. The most disturbing of these was the unexpected information that, in addition to my regular work, I was to teach physiology, rhetoric and English composition. I demurred, telling President Fairchild that I had not looked into a book on physiology since my graduation from Yale ten years before; and that, as an undergraduate, I had attended but one term of lectures on the subject. He still insisted. And I was soon giving lectures on Physiology to a class of forty-two seniors; studying the subject as best I could between times. With the appearance of the text book Martin's Human Body my work was greatly lightened.

Perhaps I ought to say that my own preparation for the teaching of chemistry was through college training under Professor Silliman at Yale; graduate work in the Sheffield Scientific School, Yale; and final graduate work in Goettingen, Germany. On my return from Germany I was private assistant to Professor Wolcott Gibbs of Harvard University. I then accepted a call to the Imperial University of Japan, in Tokyo, where, for three and a half years—1877 to 1880—I taught General Chemistry, Qualitative Analysis and Organic Chemistry, a colleague having the other branches.

When we reached Oberlin in 1880, the college itself numbered 320. The total number in all departments was 1057, and Cabinet Hall was the center of the sciences. It stood in painful contrast to the spacious, perfectly equipped lecture rooms and laboratories of the Imperial University of Japan. There we did no more than send in an order for any desired piece of apparatus or chemical and it was furnished to us as soon as it could be obtained.

On the other hand, in Oberlin at that time, economy was imperative even in the matter of floor space. The sciences of chemistry and mineralogy had the first floor of Cabinet Hall; geology, botany and zoölogy had the second floor with Professor A. A. Wright as head of all three departments. The third floor was devoted to the cabinet of natural history. This gave the name to the building—"Cabinet Hall."

CABINET HALL

The chemical department on the first floor had a lecture room, a large laboratory, a small private laboratory, a stock-room and an office for the teacher in charge. These rooms were heated by stoves which burned soft coal and did their best to keep us warm. In mid-winter they failed to do this, partly because Cabinet Hall had no cellar under any part of it. As a result the laboratory was a desperately cold room. Its brick walls were thin and exposed on three sides to the storms and winds of winter. Window frames and window sashes were shrunken with age. They rattled with every breeze and allowed the same breezes to whistle through cracks and crevices in the wood-work. Mortar between the foundation stones of the building was old too. It was cracked and broken and loosened from its moorings. It had fallen out in spots. Other breezes therefore swept back and forth under the floor of the laboratory. They found their way up through cracks in that flooring and kept the place so cold that we often placed long boards over the cracks and under the feet of the students as they worked at their desks.

During the coldest weather of each winter, a regular part of the occupation of the head of the department was to creep on hands and knees under the breeze riddled floor and thaw out frozen pipes. He used a long flexible, rubber tube, at the end of which was a lighted Bunsen burner. By directing this intense flame hither and thither and along the sides of the pipes, the thawing could be done. But it had to be done over again with the next severe freeze.

The laboratory held three rows of desks. Each accommodated twelve persons. In the same room was a long case with glass doors. This was our apparatus apartment. A large, galvanized iron water tank stood in one corner of the room; a large drum stove not far from it. Each desk was supplied with a drawer beneath which was a cupboard for apparatus.

At first, the only water available was rain from the roof, caught in four large tanks in different parts of the building. Even with strictest economy these tanks sometimes ran dry. For distilled water we had a tin-lined copper wash boiler standing on a flat-topped stove. Pipes were attached for the entrance of water and for the exit of steam. These steam pipes were in the shape of a coil of block-tin tubing, and rested in a cask of cold water. The device answered very well, but needed close watching lest it also run dry.

These then were the physical surroundings of the chemical department during the eighties and nineties of eighteen hundred. Yet, from the midst of so much discomfort, Oberlin College graduated some of the ablest men and women who have ever studied science here. Today, a few of these former students of chemistry in Cabinet Hall are either Trustees or members of the Oberlin Faculty. You know them all:—

President King, Mr. Anderegg, Mrs. Andrews, Mr. and Mrs. Bosworth, Dr. Dan Bradley, Mr. Dana Durand, Mr. Chapin, Mrs. Cowdery, Miss Fitch, Mr. R. P. Jameson, Mr. G. M. Jones, Mr. Lynds Jones, Mr. Kirshner, Dr. Leonard, Mr. and Mrs. Lord, Mrs. MacLennan, Mr. and Mrs. Martin, Mr. Lothrop, Mr. and Mrs. M. M. Metcalf, Mr. W. V. Metcalf, Mr. E. A. Miller, Mr. Robert Millikan, Mr. and Mrs. Root, Mr. Savage, Mr. John Severance, Miss Sinclair, Mr. Stetson, Miss Cora Swift, Miss Wolcott.

In addition are those who, after graduation from Cabinet Hall and Oberlin College, have taken graduate chemical work elsewhere,—at Johns Hopkins, Columbia, Chicago, Harvard, the University of Pennsylvania,—and have fitted themselves to be teachers, investigators and expert industrial workers. Speaking of two of these, Professor Morse of Johns Hopkins, once wrote: "We will take all the men you can send us like C. W. Hayes and W. V. Metcalf, and be glad to get them." Many of our chemically trained men are now occupying useful positions the country over. Some are in foreign lands.

My classes in inorganic chemistry began in 1881 with 57 students,—the smallest class I ever had in this subject. In 1886 there were 130; in 1906, 186; in 1908, 213. All these were in general chemistry. The largest class in mineralogy was in 1889 with 33 students. The same year there was a class of 56 in quantitative analysis. Organic chemistry was introduced in 1891 with a class of 9.

Laboratory work was elective until 1895—and over fifty per cent made the election. After 1895 it was required. And we had to take care of them as best we could in crowded Cabinet Hall. First we put in long tables, fitted them up with gas pipes and managed for a while. But as numbers kept on increasing, we divided them into sections. These sections followed each other at stated hours during the afternoon.

For years, no assistance of any kind was provided. The head of the department taught all the classes, and was with laboratory students the whole of each afternoon. At last, however, when the burden was obviously heavier than one man could carry alone, student help was granted. Later still, our assistants were well-trained chemists. Among them, while we were in Cabinet Hall, were R. H. Stetson, assistant in qualitative and quantitative analysis, 1893-1894; Alfred Ricksecker, assistant in general chemistry, 1894-1895; Theo. M. Focks, in charge of the chemical department, 1895-1896 (during my Sabbatical year); T. M. Taylor, assistant in general chemistry, 1896-1897; Arthur M. Hyde, 1897-1899;

Joseph S. Chamberlain, assistant, general chemstry, 1899-1900.

Instruction was always given through lectures and text-book assignments. In general chemistry the texts were:

Roscoe's Elementary Chemistry,
Wurtz's Elements of Chemistry,
Alexander Smith's Inorganic Chemistry,
Newth's Inorganic Chemistry.

In Qualitative Analysis we used:

Jones' Practical Chemistry,
Stoddard's Qualitative Analysis with Fresenius for reference.
Douglas and Prescott for reference,
Valentine, also for reference.

PROFESSOR WILLIAM K. KEDZIE

Quantitative Chemical Analysis was begun in 1886 with a class of ten. Our text was Bolton with Fresenius for reference.

In Organic Chemistry we used Remsen. Our reference and laboratory books were:

Gatterman's Organic Chemistry.
Levy's Organic Chemistry.

When we began Electro-Chemistry later, we used Provost Edgar F. Smith's Electro-Chemistry.

So much for text books!

And now we turn back to 1880, and look into the matter of laboratory equipment for that period.

First, however, there is an interesting fact to think over. By comparing catalogues, we find that Oberlin began to provide laboratory work for chemical students in 1878,—as already shown. We also find that Yale did not offer this work until 1886,—that is, eight years later.

The following statement appears in the Oberlin catalogue of 1879: "The laboratory is well furnished with fine balances and apparatus for advanced chemical work." Evidently this referred more to things hoped for than to things seen, for, in 1880, when I arrived, only one balance was to be found, and this was so old, and small, and inefficient, that it was useless for quantitative work, so I gave it to Professor Churchill for the department of physics. He said he was glad to get it because they hadn't anything quite so good.

Aside from balances in 1880, there was a fair general supply of apparatus. But as classes grew larger, more equipment was needed. I asked President Fairchild what to do about it. He advised me to make out a list of what was absolutely essential and submit it to the treasurer, Mr. Marsh. I did this. My lowest possible estimate was $300. I showed the list to Mr. Marsh and have not yet forgotten his expression of appalled astonishment. Three hundred dollars, all at once and for one department! This could not be considered for a moment. In the end, however, the sum was granted.

After that my plan was so to regulate the laboratory fee that it would cover the current expenses involved in individual work. For several years the charge was five dollars a term for general chemistry, and seven dollars and a half each for qualitative and quantitative work. The cost of breakage was charged to the individual. Undamaged apparatus was returned to the department.

At that time the college was divided into three terms. The era of two semesters began with 1901.

And what about ventilation in the crowded laboratory of Cabinet Hall? As students manufactured gases and generated inevitable odors, the atmosphere became intolerable, — especially so for those of us who spent entire days in it. Relief came when Mr. E. W. Metcalf of Elyria visited us one day. He was distressed at our condition of non ventilation, and asked if something could not be done to relieve the situation. "Not without expense," was the answer, "and we can't afford it." A few days later, he called again,—this time at my own home. "I've been thinking about the ventilation of your laboratory," he said. "Something must be done. Wouldn't this help?" And he handed me a one-hundred dollar bill. After that, stocks in health and long life went up one hundred per cent in Cabinet Hall. We turned an unused elevator shaft into a ventilating shaft. We lined the lower part of it with asbestos, put a small stove inside, made large holes in the shaft near the ceiling and thus forced an outgoing suction upward. This meant ventilation. Life was safer for us all after that.

When Spear Library was finished in 1885, Professor A. A. Wright and his three departments moved thither, leaving all three stories of Cabinet Hall to chemistry and mineralogy.

Quantitative teaching was now possible. And, as already stated, it was begun in 1886 with a class of ten. Their rather crude laboratory was on the third floor. At the same time, the lecture room in the south wing of the building was turned into a laboratory for qualitative students. It was also used after a while for organic chemistry. The private laboratory and office were now on the second floor.

By way of digression is the following:—

Until 1886, physiology was still taught by the chemist in Cabinet Hall. For much of the time, he also taught English composition and rhetoric. He had interlarded these classes with those of chemistry and mineralogy, over-crowding the room and over-crowding his teaching hours. Still there was compensation. For, among his distinguished pupils in the art of writing English were Geo. H. Mead, now professor of philosophy in Chicago University, Henry Castle of the Hawaiian Islands, and Edward I. Bosworth, now dean of our own Graduate School of Theology. Neither the writing nor the teaching of English has ever been a joy to me. But sometimes as I listen to Dr. Bosworth in his public speaking, I am tempted to wonder if it can be possible that there is any relation of cause and effect between his high attainment now and the teaching he received from me in his freshman year. Strangely enough, he himself has never implied the possibility of this to me!

To return to the subject of apparatus,— One of the economies of the earlier years saved fifty per cent of the usual outlay, but at first the prudential committee objected to it. I had told them that certain eastern colleges saved money by importing chemical supplies direct from Europe, and I urged that we do the same. The answer was that the risk was too great; that ships might sink; that even insurance was no guaranty of safety, etc. At last, in 1884, permission was granted. After that for several years, all the chemicals we needed, also all the glass, the porcelain and fine apparatus came to us direct from Germany at a saving of half what we should have had to pay to dealers in this country. We continued to economize in this way until we could get similar rates from American importers.

Wooden apparatus,—test-tube racks, filter stands and the like,—were manufactured for us in Sandusky by special order and at far less cost than was charged by the regular dealers. By using this sort of care in the buying of chemicals and equipment, we kept our current laboratory expenses down to the amount received from laboratory fees.

During those strenuous years when, in general, classes filled the forenoon from eight until twelve, when laboratory supervision and the teaching of advance students crowded the afternoon from one-thirty until four o'clock and later; when evenings were spent in getting ready for lectures, in keeping acquainted with advances made in the chemical world, in correcting test papers and examination papers, (done by the professors themselves in those days), it was refreshing to have a thread of romance running through the progress of the chemical department.

The romance began when Charles M. Hall first came to my Laboratory in 1880. He was a white haired lad, a student in the preparatory department. He came to ask if I would let him have a few pieces of glass tubing, half a dozen test tubes and a flask or two. He said he liked to work with chemical apparatus. After that he came repeatedly. And I said to a friend, "We'll be hearing from that boy one of these days." He entered college later, took the regular course, ranked well in every study, was increasingly absorbed by chemical problems, and was graduated in 1885.

Mr. Payne, a classmate of his, tells me that, in talking about aluminum in the laboratory one day, I said,—"Any person who discovers a process by which aluminum can be made on a commercial scale will bless humanity and make a fortune for himself." He adds that Hall turned to him and to one or two others and said,—"I'm going for that metal." There was no delay. He began to "go for it" at once. First, he tried reduction methods which failed. Then he turned to electricity, hoping that this might separate the metal from its ores.

The battery we constructed was a queer collection of cups, tumblers, jars, etc., with bits of carbon and zinc in each. It looked odd, but it supplied the current. It stood in my private laboratory and Mr. Hall spent all the time he could spare from his studies in seeing what he could get the battery to do for him. We talked problems over constantly. But when graduation day came the discovery had not yet been made.

Later he took his miscellaneous laboratory outfit to his own home on East College Street, and for several months, worked away with the same zeal,—reporting to me frequently. At last his reward came. Late in February, 1886, he stepped into my office one morning and, holding out his hand, said, "I've got it Mr. Jewett." There in his band lay a dozen shining globules of aluminum,—the first ever produced by the electrolytic method,—an invention destined to revolutionize the industries of the world, yet the inventor was but twenty-two years old! He and I hoth knew that a great thing had happened in the scientific world. But we could not see the difficulties ahead. One of these was the infringement of his patent by the Cowles Electric Smelting and Aluminum Company of Lockport, New York. Just then it was of advantage to Charles Hall that I remembered where I stood when he showed me his first few globules of aluminum. He needed to prove that he had made his discovery before the summer of 1886. I was summoned as a witness. And they asked me to tell them precisely what the date of the discovery was. I could not do this. But, fortunately, I did remember where I stood when Hall came to show those first glohules to me. I was in my office in the north wing of Cabinet Hall. I also told them that this wing was torn down during the summer of 1886 to make way for Peters Hall. That was sufficient. It proved that Hall's discovery was made before the summer of 1886.*

MR. LOUIS H. SEVERANCE

Judge Taft, afterwards President of the United States, presided at the trial, and declared that the infringement had been proved absolutely.

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*Aluminum is the most abundant metal in existence. It is never found in a free condition, hut always in combination with other elements forming minerals and rocks,—feldspar, mica, common clay, etc.,—not sandstone or limestone. Long after Woehler discovered the metal in 1827, European chemists secured it by a reduction process which was so expensive that its price at that time was $90 a pound.

At this point I slip in another item as an aside. While studying in Goettingen, Germany, there occasionally appeared in our laboratory the aged, retired, famous chemist, Friedrich Woehler. He it was who had discovered the element aluminum in 1827. And through him I first became acquainted with this fascinating metal. Thus it came to pass that when my own student made the discovery which put the same metal into the commercial markets of the world, the circle of my aluminum romance seemed to be complete.

So much for the chemical department and its romance! Now for its evolution. The process had, of course, been going on for years, keeping step with the evolution of the college itself. And then, in 1901, the chemical department passed with a bound from the Ice Age of Cabinet Hall to the warmth and abundance of the Severance Chemical Laboratory.

As to how it came about: Mr. John Severance, now one of our trustees, was among those who had studied chemistry in Cabinet Hall. His father, Mr. Louis H. Severance, at that time a trustee, had visited the building twice and had examined it carefully from first floor to third. For this reason it has often occurred to me that the experiences of the son, and his influence, must have had weight in the decision of the father to make his great gift. A happy decision it was for us a'l, because, precisely at that moment the new era began.

Dr. Barrows was college president at the time. Mr. H. V. Shaw of Chicago was chosen architect. And through the advice of Dr. Barrows I went to Chicago to see Mr. Shaw and to talk matters over. I was glad to do this. For, during my Sabbatical year,—1895 to 1896, —I had prepared myself for just such a possibility by inspecting the laboratories of Berlin and Leipzig, later those of Amherst, Williams, Yale and others. Now, therefore, there was no haziness in my own mind. With Cabinet Hall as a background of negatives, I thought I knew not only what we must have, but also what we must not have in our new building. It was easy to state the requirements to Mr. Shaw. Here are a few of them:—

A fine, high basement which could be warmed if necessary; rooms in it for assaying, for organic combustion, for the storage of pure and common chemicals, acids, etc., for supplies of apparatus of all sorts; also a cool room for gas analysis; an added good workroom, supplied with needed tools.

On the first floor there should be a large, well-lighted lecture room easy of access and provided with raised seats. There was to be fresh air in abundance, with ventilating fans making this invitable. In the laboratory, desks were to be far enough apart to allow ample room for movement about even when the room was filled with workers. Balance rooms and supply rooms were to be conveniently related to the laboratories. And there was to be a small, central library.

From Yale I got the idea of having the entire interior of the building lined with brick. The Yale laboratory used common brick painted a dark red. My wish was for a soft-colored, unpainted brick which would harmonize with the wood-work and help make the rooms look light and cheerful. Every laboratory was to be flooded with light.

These were a few of the specifications suggested to Mr. Shaw when, at the same time, I handed him a book on modern chemical laboratories.

We visited the new chemical building of the Chicago University, and were shown about by Professor Neff, head of the department. As we left, he said in a low voice, "I don't want you to think that I had anything to do with the planning of this building." I answered in quite as low a tone, "I'm sure neither you nor

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Today—1922—produced by Hall's electrolitic method, its price is twenty cents a pound. It is one of the lightest of the metals, is tough, does not tarnish through oxidation, and can therefore be used for a multitude of purposes:—for aluminum foil as thin as tissue paper, for the metal part of automobiles, airplanes, folding boats, type-writers, racing shells, culinary kettles, telephone and telegraph wires, etc. Previous to 1886, a few ounces of aluminum were used each year in making jewelry, medals, etc. But during 1919 the United States alone used one hundred and thirty million pounds of the metal in the manufacture of commercial commodities. This new Aluminum Age began with Hall's discovery in 1886. The steps of his process are briefly summarized as follows: The mineral cryolite is put into carbon-lined tanks and charged with a strong current of electricity which melts the cryolite. Alumina,—the oxide of aluminum,—is then added. The electric current is continued and the alumina is decomposed into aluminum and oxygen. The melted aluminum sinks to the bottom of the tank, is tapped off as required, poured into moulds and sold to the manufacturer.

any other experienced chemist had the least thing to do with it." When Mr. Shaw and I separated, I asked him to use the Chicago laboratory more as a warning than as an example.

Soon afterwards he came to Oberlin to study the prospective location of the new structure. He found the corner lot too small. Whereupon Mr. Metcalf of Elyria came to our help again. He gave us a lot of his own just west of ours on Lorain Street. This was precisely what we needed. Mr. Shaw now pushed his plans forward and showed himself most sympathetic in the radical changes suggested in his plans after he had drawn them. It was an immense satisfaction to work with him.

After the planning came the bids of the contractors. Mr. George Feick of Sandusky, received the contract. The ground was broken and work started in October, 1899. Various delays followed. But, on the 31st of May, 1900, the corner stone was laid.

The day itself was glorious and the scene picturesque, largely so perhaps because Miss Elizabeth Severance, now Mrs. F. F. Prentiss of Cleveland, the beautiful daughter of the donor, was the center of the picture in the ceremony of the laying of the stone.

PROFESSOR F. F. JEWETT

We watched her as she stood in queenly dignity studying the bubble in the level. At first it did not rest just where it should. And she asked that a bit of adjusting be done. The workmen rapped vigorously on this side of the stone and that. And when the bubble reached the precise spot where it belonged in the center of the level, she herself struck the stone with her small mallet and declared it to be "well and truly laid."

Building went on steadily after that until we faced a blunder which for the moment, seemed to be almost a tragedy. The first story of the laboratory had been finished early in the summer of 1900. And I had left town with the conviction that nothing could go wrong because the second story was to be finished off exactly like the first. When I returned, however, I found that inferior, overbaked brick had been used throughout the entire lining of the second story. Nothing had escaped save a small part of one small room. The appearance was mottled, most unattractive. And the question was what to do about it. I mailed one of those inferior bricks to the architect, and, by telegraphic message, told him why I sent it. He telegraphed back:—"Stop work until I arrive."

He came the next day, inspected the walls, asked what I thought ought to be done, and said I was to decide the question. I answered that I should like to have the lining taken off and the work done over again according to contract. He said, "Very well, it shall be done."

This discouraging job of taking off imperfect brick and putting on those which were perfect required the entire winter and spring. The expense involved for some one,—I never knew who was to blame,—could not have been less than a thousand dollars. But I have not ceased to be thankful that it was put right at last.

Sixteen months after the corner stone was laid, on the 26th of September, 1901, the Severance Chemical Laboratory was dedicated. Exercises were held in the old college chapel. President Barrows presided, while Dr. Ira Remsen of Johns Hopkins University, gave the dedicatory address.

Dr. Barrows then introduced the distinguished donor himself, Mr. Louis H. Severance. The applause which greeted him showed what a hold he had on the entire college and community.

(F. F. J. protests against using the whole of the following quotation. He thinks the reference to himself should be omitted. But F. G. J. is quite sure that the historical record would be incomplete without the personal reference.)

Among other things Mr. Severance said:—

"With these improved facilities, it is hoped that those who enter into active life from this department may enjoy their labors to the full, and go forth with a determination to make the world better for having been privileged to enter herein. Professor Jewett who has so patiently waited, looking forward to the thing hoped for and now seen, is a worthy example of fidelity, and he is to enter into the reward of one who has been faithful in that which is least. To him all credit is due for the completeness of plans and thoroughness with which they have been executed."

As he sat down, Mr. Severance placed a slip of paper in Dr. Barrows hands. He took it, stepped to the desk, and opening the paper said, "Mr. Severance has placed this paper in my hands, but I don't know its contents. I will read it to you." The following is what he read to the excited audience:—

"To make what has been commenced more complete, there is now added a further sum of forty thousand dollars as an endowment for the chair so ably occupied by Professor Jewett." The audience saw at once that Mr. Severance had now raised his gift to the large sum of one hundred and twenty-five thousand dollars, and they applauded with intensified enthusiasm.

So it came to pass that Oberlin tradition repeated itself. The first building put up for the use of a single science, and that science chemistry, was the Old Laboratory in 1838. And now, in the modern era, the first building to be devoted to a single science, and that science chemistry, was the Severance Chemical Laboratory.

Before he left town, Dr. Remsen said: "I wish we had as good a laboratory at Johns Hopkins."

The migration from Cabinet Hall to the new laboratory was quite informal. A class in organic chemistry was at work when one of the young women said, "Why can't we go over into the new Lab. very soon? Why can't we go today?" This was before the dedication, even before the final touches had been added. I knew that the large laboratory was finished, and that there could not be the slightest objection to our using it. "Very well," I said, "if you will take trays and carry your own apparatus over, I'll assign your places and you can go on with your work there,"—the first class in the new building..

Those young people co-operated instantly. They loaded their trays, held them aloft when they could, and, like the Israelites of old, we marched across from Egypt into the promised land of Canaan. It was a quick trip, with no Red Sea to be rolled aside for us.

And when we were safely within the border of this promised land, one of the radiant girls set her tray down with a sigh of relief, glanced about the large, bright, clean room and exclaimed: "My! Isn't this Heaven!" It seemed so to us all. For, as a department, we had been in the captivity of Cabinet Hall for twenty-one years.

In addition to all else, Mr. Severance now gave $2,500.00 for the purchase of new equipment. Writing about it he said, "It is my desire that the building should be complete in all its appointments."

The library of the laboratory is on the second floor. It overlooks the campus which, in 1834, was a wilderness of stumps; which today is a lovely stretch of shade trees with attractive walks under them. Chemistry is entitled to this view, for Charles Hall, the chemist, spent $25,000.00 of his aluminum success in beautifying the campus. He also left about three million dollars to Oberlin College in his will.

The library has not only its beautiful view outside, but within, it has shelves stocked with chemical books and bound periodicals. Its earliest gift was from Mr. Seabury C. Mastick of the class of 1891. He asked what was most needed. When I suggested bound copies of Liebig's Annalen covering the previous twenty-five years, he said: "I'd like to give them to the library. Suppose you order them and send the bill to me." Later, my own copies of the German Berichte from 1870 continuously until now were bound by the college and accepted as a gift to the chemical library.

And now for another bit of information,—another contrast: Above the western wing of this beautiful building, as if to cap the climax of the Severance Chemical Laboratory, is its scientifically sensitive government-owned weather-vane. From the day it was put up until today it has not ceased to show which way the wind blows. This is in striking contrast to the weather-vane on the theological building which, for over forty years, has pointed due east no matter which way the wind blows.

The activities of the department in the new laboratory were a glorified edition of the same activities as conducted in Cabinet Hall. The differences were in the mental outlook, in the physical comfort, in the ease with which laboratory work could be carried on, in the genial warmth which enveloped us through severe winter weather, in the well-being and sense of hopes realized that gave encouragement to us all.

The courses of study were practically the same as those carried on in Cabinet Hall.—General Chemistry, Qualitative Analysis, Quantitative Analysis, Organic Chemistry and Mineralogy. In addition we now had Physical Chemistry, Electro-Chemistry and Assaying. These were possible at last because we had more room, more assistance, and incomparably better equipment than ever before.

The associates and assistants who helped carry on this work after we left Cabinet Hall and until 1912 were:

Thomas W. Taylor, Ph.D., the first associate professor in the chemical department, 1901-1906.

W. H. Chapin, Ph.D., Assistant, 1902-1906; Inst., A.B., 1906-1907; Associate Professor, 1910—.

C. W. Morrow, A.B., Assistant, 1906-1908.

J. C. McCullough, M.S., Inst., 1907-1911; Associate Professor, 1911 .

A. H. Clark, A.B., Assistant, 1910-1911.

This brings the sketch of the development of the chemical department down to 1912,—the time of my retirement on the Carnegie Foundation after thirty-two years of service, and during the tenth year of President King's administration.

In closing, let me say that it gives me great satisfaction to refer to my colleagues and friends who now are carrying forward the work of this department. The requirements of chemistry enlarge year by year. Each decade makes increasing demands upon the study, the labor, and the research of the modern teacher of this wonderful science. These demands must be met by every institution that would keep abreast of the times. And this it is that gives me satisfaction now. For, with Dr. Holmes as the able and brilliant head of the department, and with Professors Chapin, McCullough and Lothrop supporting him, the outlook for the future of the Chemical Department of Oberlin College is exceedingly bright.